



Leaky Faucet

Based on Project WET: A Drop in the Bucket and Money Down the Drain



Summary: Students learn how little fresh drinking water we have on Earth. They measure and calculate wasted water from a leaky faucet, and discuss ways they can help to conserve our limited water resources.

Grade: Five

Subject Areas: Science, Math

Activity Materials:

For Demo: Drop in the bucket kit or graduated cylinders

1000 mL

100 mL

10 mL

A dropper and a tin bucket

Materials per each small group

- One plastic tub or cup with a nail hole in bottom
- One plastic tub or cup with a needle hole in bottom
- Stop Watch
- Calculator
- Leaky Faucet Lab Sheet (one/group or one/student)

Poster for the whole group

- Gallons per Capita per day poster
- We thought the aquifer looked like this poster

Common Core Standards and Benchmarks

Speaking and Listening Standards Grade 5

1. Engage effectively in collaborative discussions with diverse partners on grade 5 topics . . .

Measurement and Data Grade 5

Convert like measurement units within a given system.

Relate volume to the operations of multiplication and addition and solve real work math problems using volume.

NexGen Science Standards and Benchmarks

ESS2.C: The Roles of Water in Earth's Surface Processes ♣ Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5- ESS2-2)

ESS3.C: Human Impacts on Earth Systems ♣ Human activities in . . . everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

Standard units are used to measure and describe physical quantities such as time and volume (5-PS1-2)

Conduct an investigation collaboratively to produce data (5-PSI-4)

Make observations and measurements to produce data (PSI-3)

Measure and graph quantities such as weight (volume) (PSI-2)

Use models to describe phenomena (5-PS3-1)

NM Science Standards and Benchmarks

I.I.1.5.2 Use appropriate technologies (e.g., calculators, computers, balances, spring scales, microscopes) to perform scientific tests and to collect and display data.

I.I.III 5.2. Use mathematical skills to analyze data.

I.I.III 5.3. Make predictions based on analyses of data, observations, and explanations.

II.III.II.5.3. Know that most of Earth's surface is covered by water, that most of that water is salt water in oceans, and that fresh Water is found in rivers, lakes, underground sources, and glaciers.

Social Studies Standards and Benchmarks

II.C.5.1 Describe how man-made and natural environments have influenced conditions in the past.

Geo.II.F.5.1 Understand how resources impact daily life.

Explain the difference between rights and responsibilities, why we have rules and laws, and the role of citizenship in promoting them

Talking Points:

- Most of the water on Earth is either not available or not clean enough for us to drink (or both).
- Our water comes from rivers and from the aquifer.
- The aquifer is not as big as we thought, and it doesn't get replenished as quickly as we are using it.
- River water depends on snow and we are in a drought.
- We want to save water, and one way to save water is not to waste water.
- By calculating how much water is wasted in a leak, we can see that little actions really do add up to a sizeable number.
- Give tips about how to stop wasting water and how to find water leaks.

Warm Up (10 minutes) Students should be in groups of 3 – 4 students.

Ask students to think of all the places water is found – think about all three phases or states of water so they think of glaciers and clouds and air. It can travel too, so don't leave out groundwater, or water in plants. Circle the places they thought of that can provide drinking water for us. Some groundwater is salt, so you can use a dotted line to indicate that.

Ask students to predict the percent of water on Earth that we can drink.

Fresh Water Demonstration (5 minutes)

Do the drop in the bucket demonstration:

- All the water in the world is 1000 mL. 970 mL are salt. Pour 30 mL into the 100 mL graduated cylinder.
- Of the 30 mL of fresh water, 24 mL are frozen. Pour the useable 6 mL into the 10 mL cylinder
- Of the 6 mL, most is inaccessible ground water or polluted water. Take out one dropper for the available, clean, fresh water that we can drink and drop it into a metal bucket. Listen to the plink. It's .003% of all water on Earth.

Activity: (15 minutes)

Explain how we thought we had more aquifer water than we do have. Explain that we now drink river water from the San Juan River which is a tributary to the Colorado River. Even so, we still use more water from the aquifer each year than nature replenishes. What should we do? Conserve. One good way to conserve is to fix leaky faucets.

Demo the slow leak and the fast leak. Make sure there is always enough water in the cup to produce the pressure that is necessary for the leak to flow. That is how faucets work – always under pressure. Show them how to read the graduated cylinder using the bottom of the meniscus.

Explain that they will do the experiment with each cup three times. If they only finish one cup (fast or slow) they will be getting data from another group for the cup they are missing. Show students how to find the average of three numbers.

Hand out lab sheets. Ask students to predict how much water is wasted by a slow leak in a faucet in one year. How about a fast leak? Ask them to put their predictions on the lab sheet page.

Answer questions from students about what they will be doing. Give each group a set up with one slow plastic cup, one fast plastic cup, a graduated cylinder, and a calculator, along with their lab sheet(s). Let them do the measurements and calculations.

Put each group's answer(s) up on the board in two columns, one for slow and one for fast.

Math Calculation (10 minutes)

Go through their calculations with them. Talk about how to round to the ones place. Talk about each step as you do it.

Ask students if anybody was close to their prediction. Where their predictions generally too high or too low?

Discussion

How can you tell if you have a leak?

- Your water bill will show you're using lots more water.
- Putting toilet tablets or food coloring in the tank of your toilet. If it shows up in your bowl, it's a leak.
- If there is a leak in the pipes in the roof, you might see mold or even water trickling down the wall.

Let students know that we don't expect them to pull out a plumber's wrench and start fixing leaks. But they can bring any leaks to the attention of an adult who can call a plumber. Or, if that is not feasible, how about just catching the water in a bowl and using it to water a pet or a plant. Maybe they could use it to wash the floor. At least it wouldn't be wasted water.

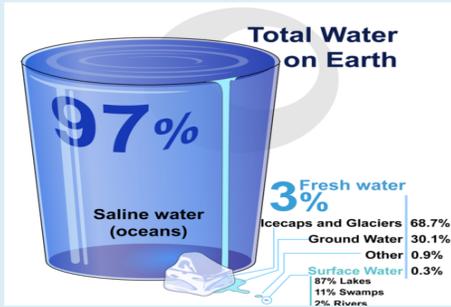
Ask if they know of any other ways we waste water. Do we have a right to all the water we want to use? Or is it our responsibility to never waste water? Here are some ideas to help them remember not to waste water:

- Sprinklers that water the street, not the plants (you can be fined)
- Watering our yards during the hot part of the day (you can be fined)
- Letting the shower water run when you aren't using it. This is a personal responsibility since nobody is going to go in and check to see if they are wasting shower water. Remind them that long showers waste water, the electricity it took to clean and pump the water, and the heat that it took to make the water hot!

Questions? Contact Erin Keck
ekeck@abcwua.org 289-3027



Water Utility
Authority



Fresh Water Informational Text



Summary: Students read how little water on earth is fresh water. They learn about ways we can all conserve water to protect this precious resource.

Grade: Five

Subject Areas: Reading
Informational Science Text

Common Core Standards and Benchmarks

READING INFORMATIONAL TEXTS

Key Ideas and Details:

[CCSS.ELA-Literacy.RI.5.2](#)

Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. Integration of Knowledge and Ideas

[CSS.ELA-Literacy.RI.5.3](#)

Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

Craft and Structure:

[CCSS.ELA-Literacy.RI.5.4](#)

Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.

Integration of Knowledge and Ideas

[CCSS.ELA-Literacy.RI.5.8](#)

Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).

NextGen Science Standards and Benchmarks

5-ESS2 EARTH'S SYSTEMS

ESS2.C: The Roles of Water in Earth's Surface Processes

Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

NM Science Standards and Benchmarks

Strand II: Content of Science Standard III (Earth and Space Science

II.5.3. Know that most of Earth's surface is covered by water, that most of that water is salt water in oceans, and that fresh water is found in rivers, lakes, underground sources, and glaciers.